

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner  
 US Department of Commerce  
 United States Patent and Trademark  
 Office, PCT  
 2011 South Clark Place Room  
 CP2/5C24  
 Arlington, VA 22202  
 ETATS-UNIS D'AMERIQUE  
 in its capacity as elected Office

<b>Date of mailing</b> (day/month/year) 07 February 2001 (07.02.01)	
<b>International application No.</b> PCT/GB00/02450	<b>Applicant's or agent's file reference</b> CDK1694
<b>International filing date</b> (day/month/year) 22 June 2000 (22.06.00)	<b>Priority date</b> (day/month/year) 24 June 1999 (24.06.99)
<b>Applicant</b> HAWKINS, John	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

20 December 2000 (20.12.00)

☐ in a notice effecting later election filed with the International Bureau on:
2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Pascal Piriou Telephone No.: (41-22) 338.83.38
---	---

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>CDK1694</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 00/02450</b>	International filing date (day/month/year) <b>22/06/2000</b>	(Earliest) Priority Date (day/month/year) <b>24/06/1999</b>
Applicant <b>RHODIA CONSUMER SPECIALTIES LIMITED et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.



None of the figures.

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
4 January 2001 (04.01.2001)

PCT

(10) International Publication Number  
**WO 01/00780 A1**

- (51) International Patent Classification<sup>7</sup>: C11D 17/00, 1/72, 3/04
- (74) Agent: BARKER BRETTELL; 138 Hagley Road, Edgbaston, Birmingham B16 9PW (GB).
- (21) International Application Number: PCT/GB00/02450
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (22) International Filing Date: 22 June 2000 (22.06.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
9914674.8 24 June 1999 (24.06.1999) GB
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- (71) Applicant (*for all designated States except US*): RHO-DIA CONSUMER SPECIALTIES LIMITED, trading as ALBRIGHT & WILSON SURFACTANTS EUROPE [GB/GB]; 210-222 Hagley Road West, Oldbury, West Midlands B68 0NN (GB).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): HAWKINS, John [GB/GB]; 21 Chandler Avenue, Kinver, South Staffordshire DY7 6AG (GB).
- Published:**  
— With international search report.
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: SURFACTANT EMULSIONS AND STRUCTURED SURFACTANT SYSTEMS

(57) Abstract: A mixture of an ethoxylated non-ionic surfactant having an average of 20 to 100 ethylene-oxy groups per molecule with from 10 to 150 parts by weight of a water soluble thiocyanate stabilises non-ionic emulsions and in particular deflocculated non-ionic structured surfactant systems by raising the lamellar/L<sub>2</sub> phase transition temperature.

WO 01/00780 A1

**SURFACTANT EMULSIONS**  
**AND STRUCTURED SURFACTANT SYSTEMS**

The present invention relates to non-ionic surfactant emulsions and to the formulation of structured surfactant suspending systems. It is particularly relevant to the formulation of laundry detergents especially those used for industrial and institutional cleaning.

**STRUCTURED SURFACTANT**

Suspending solids in liquids presents a problem. If the solids differ in density from the liquid they will tend either to sediment or float. Increasing the viscosity of the liquid can retard, but not prevent such separation, and high viscosities are generally undesirable. Colloidal systems, in which the suspended particles are sufficiently small to experience Brownian motion, e.g. less than 1 micron, may be kinetically stable. However the difficulty or undesirability of comminuting some solids to such sizes, and the impossibility of maintaining many of them at this level in the face of crystal growth or agglomeration, limits the use of colloidal suspensions.

Adjusting the density of one phase to match that of the other is usually impracticable. Moreover such systems are almost always temperature-unstable due to differential rates of thermal expansion.

One method of suspension which permits even relatively large particles to be stably suspended is structured surfactant. The term covers systems in which a surfactant mesophase, usually a lamellar or G-phase, alone or more usually interspersed with an aqueous phase, provides a yield stress which is sufficient, when the system is at rest, to immobilise any suspended particles, but which is sufficiently low to allow the system to be poured like a normal liquid. Such systems may display very low apparent viscosities when stirred, pumped or poured and yet be capable of maintaining particles, sometimes of millimetre or larger size, indefinitely in suspension.

Three main types of suspending system have been employed in practice, all involving a G-phase, in which bilayers of surfactant are arranged with the hydrophobic part of the molecule on the interior and the hydrophilic part on the exterior of the bilayer (or vice versa). The bilayers lie side by side, e.g. in a parallel or concentric configuration, Sometimes separated by aqueous layers. G-phases (also known as  $L_{\alpha}$  phases) can usually be identified by their characteristic textures under the polarising microscope and/or by x-ray diffraction, which is often able to detect evidence of lamellar symmetry. Such evidence may comprise first, second and sometimes third order peaks with d-spacing ( $\frac{2\pi}{Q}$  where  $Q$  is the momentum transfer vector) in a simple integral ratio 1:2:3. Other types of symmetry give different ratios, usually non integral.

Most surfactants form a G-phase either at ambient or at some higher temperature when mixed with water in certain specific proportions. However such G-phases cannot usually be used as structured suspending systems. Useful quantities of solid render them unpourable and smaller amounts tend to sediment.

The main types of structured system used in practice are based on dispersed lamellar, spherulitic and expanded lamellar phases. Dispersed lamellar phases are two phase systems in which the surfactant bilayers are arranged as parallel plates to form domains of G-phases which are interspersed with an aqueous phase to form an opaque gel-like system. They are described in EP O 086 614.

Spherulitic phases comprise well defined spheroidal bodies, usually referred to in the art as spherulites, in which surfactant bilayers are arranged as concentric shells. The spherulites usually have a diameter in the range 0.1 to 15 microns and are dispersed in an aqueous phase in the manner of a classical emulsion, but interacting to form a structured system. Spherulitic systems are described in more detail in EP O 151 884.

Many structured surfactant systems are intermediate between dispersed lamellar and spherulitic, involving both types of structure. Usually systems having a more spherulitic character are preferred because they tend to have lower viscosity. A variant on the spherulitic system comprises prolate or rod shaped bodies sometimes referred to as batonets.

A third type of structured surfactant system comprises an expanded G-phase. It differs from the other two types of structured system in being essentially a single phase, and from conventional G-phase in having a wider d-spacing. Conventional G-phases have a d-spacing of about 5 to 7 nanometers. Attempts to suspend solids in such phases result in stiff pastes which are either non-pourable, unstable or both. Expanded G-phases with d-spacing between 8 and 20, e.g. 10 to 15 nanometers, form when the electrolyte is added to aqueous surfactants at concentrations just below those required to form a normal G-phase, particularly to surfactants in the M phase. The M phase comprises surfactant molecules arranged to form cylindrical rods of indefinite length. It exhibits hexagonal symmetry and a distinctive texture under the polarising microscope. Typical M phases have so high a viscosity that they appear to be curdy solids. M phases near the lower concentration limit (the  $L_1$ /M phase boundary) may be pourable but have a very high viscosity and often a mucous-like appearance. Such systems tend to form expanded G-phases particularly readily on addition of sufficient electrolyte.

Expanded G-phases are described in more detail in EP O 530 708. In the absence of suspended matter they are translucent, unlike dispersed lamellar or spherulitic phases which are necessarily opaque. They are optically anisotropic and have shear dependent viscosity. In this they differ from  $L_1$  phases which are micellar solutions and which include microemulsions.  $L_1$  phases are clear, optically isotropic and substantially Newtonian. They are unstructured and cannot suspend solids. Some  $L_1$  phases exhibit small angle x-ray diffraction spectra which show evidence of hexagonal symmetry. Such phases usually have concentrations near the  $L_1$ /M phase boundary and may form expanded G-phases on addition of electrolyte.

Most structured surfactant systems require the presence of electrolyte as well as surfactant and water in order to form structured systems capable of suspending solids. However certain relatively hydrophobic surfactants such as isopropylamine alkyl benzene sulphonate can form spherulites in water in the absence of electrolyte. Such surfactants are capable of suspending solids in the absence of electrolyte as described in EP O 414 549.

### FLOCCULATION

A problem with the two phase structured surfactant systems, and especially spherulitic systems, is flocculation of the dispersed surfactant structures. This tends to occur at high surfactant and/or high electrolyte concentration. It can have the effect of making the composition very viscous and/or unstable with the dispersed surfactant separating from the aqueous phase.

Certain amphiphilic polymers have been found to act as deflocculants of structured surfactants. One type of deflocculant polymer exhibits cteniform (comb-shaped) architecture with a hydrophilic backbone and hydrophobic side chains or vice versa. A typical example is a random copolymer of acrylic acid and a fatty alkyl acrylate. Cteniform deflocculants have been described in a large number of patents, for example WO-A-9106622.

A more effective type of deflocculant has surfactant rather than cteniform architecture, with a hydrophilic polymer group attached at one end to a hydrophobic group. Such deflocculants are typically telomers formed by telomerising a hydrophilic monomer with a hydrophobic telogen. Examples of surfactant deflocculants include alkyl thiol polyacrylates and alkyl polyglycosides. Surfactant deflocculants are described in more detail in EP O 623 670.

A disadvantage of both surfactant and cteniform deflocculants is that the concentration required to deflocculate to optimum viscosity is critical within fairly narrow limits and varies with temperature. Either too little or too much deflocculant

causes instability and/or excessive viscosity. As a result the deflocculated systems tend to separate if the temperature varies significantly. In particular there is a tendency to form a clear bottom layer on prolonged standing.

One approach to the problem of temperature stability has been to add highly cross linked polyacrylates (see US 5 602 092). These are difficult to disperse in the structure liquid. Our copending application of even date describes the use of certain copolymers to prevent the bottom separation.

### **APPLICATIONS OF STRUCTURED SURFACTANT**

Structured surfactants have been applied to the problems of suspending: water insoluble or sparingly soluble builders in laundry detergent; antifoams and enzymes in laundry detergents and other surfactant systems; abrasives in hard surface cleaners; pesticides and oils in agrochemical preparations (EP O 388 239 and EP O 498 231); rock cuttings in drilling muds (EP O 430 602); dyestuffs in dyebath concentrates and printing inks (EP O 472 089); talcs, oils and other cosmetic ingredients in personal care formulations.

### **THE PROBLEM**

A further kind of temperature instability is often observed with more concentrated structured surfactants especially deflocculated structured surfactants. It typically involves sedimentation of the suspended solid when the composition is stored under warm conditions. We now believe that this separation may be due to a tendency for a phase change in the surfactant from dispersed lamellar or spherulitic to  $L_2$  at elevated temperature.

A similar problem sometimes occurs when attempts are made to prepare non-ionic surfactant emulsions at high concentrations.



A particular problem arises in relation to liquid detergents suitable for use in industrial and institutional laundries, such as factories, hospitals and hotels and especially in automatically dosed washing machines.

An ideal laundry detergent for institutional use would combine: high surfactant levels and in particular high levels of non-ionic surfactant, which has been found particularly effective for removing soil; high alkalinity, to saponify fatty soil; and high levels of builder, which improve the performance of the surfactant by counteracting the effects of calcium in the water. The composition must be homogeneous and pourable and the concentration as high as possible. Unfortunately it is generally difficult to combine surfactants with electrolytes at high concentrations to form stable compositions. It has proved particularly difficult to achieve this with non-ionic surfactants which are not capable of forming stable solutions at high alkalinity or in the presence of electrolyte, except at very low concentrations which are too low to be commercially acceptable. As a consequence it has hitherto been customary to use two separate solutions in institutional machines, one to supply the surfactant and a separate solution as the source of the alkali.

Attempts to combine the two in a single formulation have hitherto been unsuccessful. Even the use of a deflocculant such as those described in EP-A-0 623 670 or EP-A-0 346 995 has not been successful in forming a sufficiently stable homogeneous phase of commercially acceptable concentration, or has done so only over a very restricted temperature range.

### THE SOLUTION

We have now discovered that a mixture of a highly ethoxylated non-ionic surfactant and an alkali metal thiocyanate can form highly concentrated emulsions which are temperature stable and also improves the temperature stability of deflocculated structured surfactants. It is readily dispersed in aqueous systems, which are rendered less sensitive to temperature variations thereby.

The mixture is particularly useful for preventing instability in concentrated industrial and institutional detergent. We believe that the mixture inhibits the transition from a G-phase or structured system to an L<sub>2</sub> phase by elevating the phase transition temperature.

### **THE INVENTION**

Our invention, according to a first embodiment provides a mixture of an ethoxylated non-ionic surfactant having an average of from 20 to 100 ethylene-oxy groups per molecule with from 0.1 to 150 parts by weight of a water soluble thiocyanate.

According to a second embodiment the invention provides a concentrated non-ionic surfactant emulsion comprising water, and said mixture in a concentration adapted to form an emulsion or G phase at a temperature below 40°C

According to a third embodiment our invention provides a structured surfactant composition capable of suspending solids which comprises a structuring surfactant, water and, if required, electrolyte in relative proportions adapted to form a dispersed lamellar and/or spherulitic structured surfactant system, capable of forming an L<sub>2</sub> phase at some temperature below 50°C and, optionally sufficient of a deflocculant to inhibit the flocculation of said system characterised in that said composition comprises an effective amount of a phase stabiliser which is a mixture of (i) an ethoxylated non-ionic surfactant having from 20 to 100 ethylene oxy groups and (ii) a water soluble thiocyanate in a relative molar proportion (i):(ii) of from 1 : 200 to 20:1.

Preferably said structuring surfactant consists of a major amount of non-ionic surfactant, typically an ethoxylate with 1 to 15 e.g. 2 to 10 ethylene oxide and optionally a minor amount of anionic and/or amphoteric surfactant. Preferably said water is present in a proportion of from 20 to 60%. Preferably said electrolyte comprises alkali.

### THE PHASE STABILISER

The stabiliser may comprise an ethoxylated C<sub>8-20</sub>, straight or branched chain alcohol or fatty acid, fatty amine, sorbitan or glycerol ester, alkyl polypropoxy group or alkyl phenyl group. The number of ethoxy groups may be from 20 to 100, e.g. 30 to 80, preferably 40 to 60. The mole ratio of (i):(ii) may preferably be from 1:100 to 10:1, e.g. 1:50 to 5:1. When added to a structured surfactant system we prefer that the surfactant (i) be present in an amount of from 0.1 to 3% by weight of the total composition, preferably 0.2 to 2%. The maximum concentration depends on the amount of the structuring surfactant present, higher levels being preferred for higher concentrations of structuring surfactant. Excessive amounts break structures. The thiocyanate is preferably present in an amount greater than 0.05%, more preferably greater than 0.1%, e.g. greater than 0.5%. The upper limit is not critical but concentrations greater than about 10% are unlikely to provide additional benefit. Concentrations greater than 2% are generally uneconomic.

The thiocyanate may be any water soluble thiocyanate but is preferably an alkali metal or ammonium thiocyanate and most preferably potassium thiocyanate.

### INSTITUTIONAL AND INDUSTRIAL FORMULATIONS

According to a preferred embodiment the invention provides a detergent composition comprising:-

- (A) 10 to 50% by weight of the composition of water;
- (B) At least 3% based on the weight of the composition, preferably 4 to 10%, of a structured surfactant comprising more than 50% based on the total weight of surfactant of non-ionic surfactants having a mean HLB of from 8 to 15 and optionally a smaller proportion of anionic and/or amphoteric surfactant;
- (C) At least 10% by weight based on the weight of the composition of builders;

- (D) At least 7% based on the weight of the composition of dissolved non-micelle-forming salts and bases which dissociate at least partially in solution into ions, including any dissolved portion of said builder;
- (E) A total free alkalinity of at least 0.5 normal;
- (F) Sufficient of a deflocculant to provide, in conjunction with components A to E above a pourable composition which does not separate after 1 month at 25°C;

Wherein there is additionally from 0.01% to 5% by weight of an auxiliary stabiliser consisting of  $C_{8-20}$  alcohol ethoxylates having an average of from 25 to 100 ethyleneoxy groups per molecule, together with a water soluble, preferably potassium, thiocyanate.

The amount of water is typically greater than 15%, preferably greater than 20%, especially greater than 25% and usually greater than 30% based on the total weight of the composition.

The structuring surfactant is preferably all non-ionic since in some applications inclusion of anionic surfactant can adversely affect performance. However where anionic surfactant can be tolerated its inclusion has the advantage of enabling higher total concentrations of surfactant to be more easily achieved. Typically wholly non-ionic based formulations contain from 7 to 30%, more typically 10 to 25% by weight surfactant while compositions containing a minor proportion of anionic surfactant may contain up to 50% by weight, e.g. 15 to 40%, especially 20 to 35%.

The non-ionic surfactant preferably consists of from 60 to 100% by weight of alkoxyate, preferably ethoxyate or mixed ethoxyate/propoxyate. Typically it comprises alkoxyated  $C_{8-20}$ , especially  $C_{10-18}$  natural or synthetic alcohols. The

alcohols are typically primary or secondary, straight or branched chain, saturated or unsaturated. Also effective are alkoxylated fatty acids, fatty amines, alkyl phenols, glyceryl mono and dialkyl esters and sorbitan esters.

The ethoxylate typically contains an average of from 1 to 10 alkoxy groups depending on the alkyl chain length, to give an HLB of from 10 to 15, preferably 12 to 14.

The non-ionic surfactant may comprise a mono- or di- ethanolamide or an amine oxide. The surfactant may optionally contain a minor proportion (i.e. less than 50% based on the total weight of surfactant) of anionic surfactant such as soap and/or alkyl benzene sulphonate. Other anionic surfactants which may be used include alkyl ether sulphates, alkyl sulphates, olefin sulphonates, paraffin sulphonates and alkyl phosphates.

The builder is preferably sodium tripolyphosphate, but may alternatively be or comprise sodium or potassium pyrophosphate, sodium or potassium citrate, sodium or potassium carbonate or a zeolite. Other builders include EDTA, nitrilotriacetate, phosphonates and poly electrolytes such as polyacrylates or polymaleates. The term "builder", as used herein, excludes any hydroxides used to provide the free alkali but includes carbonate and silicate. The builder is present in amounts greater than 10% by weight based on the total weight of the composition, preferably more than 15%. Levels of builder may be above 20%, any excess over the solubility in the system being present as suspended particles. Builder concentrations do not normally exceed 50% by weight and are usually less than 40%, e.g. less than 30%.

The composition contains a total of at least 7% by weight of dissolved surfactant desolubilising salts and bases. This includes any dissolved portion of the builder and any alkali required to provide the free alkalinity.

It excludes micelle forming components such as anionic surfactant. The dissolved salts and bases preferably constitute from 10 to 40%, e.g. 15 to 30% by weight of the composition, and sufficient to form a multiphase system in which an aqueous phase is interspersible with a surfactant or surfactant mesophase.

The total free alkali should be sufficient to neutralise at least an equal volume of 0.5 normal HCl. Preferably the free alkalinity is from 0.7 to 2 normal, e.g. 0.8 to 1.5.

We particularly prefer that compositions of the invention contain a deflocculant. The deflocculant may be a polycarboxylate having on or more alkyl groups such as C<sub>8-20</sub> alkyl thiol polycarboxylate e.g. polyacrylate or polymaleate, or a copolymer of unsaturated carboxylic acid with a C<sub>8-20</sub> alkyl ester of an unsaturated carboxylic acid e.g. a copolymer of acrylic acid and/or maleic acid with a minor proportion of a C<sub>8-20</sub> alkyl acrylate and/or alkyl maleate ester. Alternatively it may comprise an alkyl polyglycoside. The alkyl polyglycoside is preferably a polyglucoside and typically has an average degree of polymerisation between 1.3 and 10, more usually 1.5 to 3.

The deflocculant is generally added in an amount sufficient to provide an interspersion of the aqueous phase with the surfactant phase at 25°C, which does not separate within 1 month. This may typically require from 0.5 to 10, more usually 1 to 5%, e.g. 2 to 4.5% by weight based on the weight of the composition. The amount is preferably adjusted to obtain a spherulitic composition comprising surfactant vesicles, usually having a multilamellar or G-phase structure, dispersed in an aqueous phase.

The auxiliary stabiliser may be present in proportions up to 5% by weight, usually 0.01 to 3%, e.g. 0.02 to 2 especially 0.01 to 1. Combinations of two or more auxiliary stabilisers may sometimes be particularly effective.

The detergent compositions of the invention preferably also contain the conventional minor detergent ingredients including antifoams such as silicone antifoam, soil suspending agents such as a carboxymethyl cellulose, optical brighteners, stain removers such as enzymes, bleaches including perborate metaborate mixtures,

sequestrants such as phosphonates and especially amino phosphonates including aminotrismethylene phosphonate, ethylene diamine tetrakis (methylene phosphonate), diethylene triamine pentakis (methylene phosphonate) and others in the same series, perfumes, colouring, preservatives, corrosion inhibitors, bleach activators such as TAED and/or fabric conditioner.

The aforesaid minor ingredients may all be present in conventional amounts and usually constitute a total of less than 5% by weight of the composition, typically less than 1%. The anionic component of the ionic ingredients may typically be sodium, potassium or a mixture of the two. Potassium is preferred where very high solids contents are desired.

The invention is illustrated by the following examples in which all proportions are by weight of the 100% material based on the weight of the composition.

	% wt/wt
Potassium thiocyanate	0.5
<b><u>Optical brightener "TINOPAL" @ CBS/X</u></b>	0.1
C <sub>12-14</sub> alkyl (polyglucoside (dip.=1.4))	2.25
Sodium tripolyphosphate	19.0
C <sub>12-18</sub> alkyl fifty mole ethoxylate	0.4
C <sub>12-14</sub> branched alkyl seven mole ethoxylate	11.0
Sodium hydroxide	10.0
Water	balance

The above product was an effective industrial and institutional laundry detergent. In the absence of the alkyl polyglycoside the composition was heavily flocculated and underwent rapid separation. In the absence of the potassium thiocyanate and/or the fifty mole ethoxylate the product separated at temperatures above 30°C.

CLAIMS

1. A mixture of an ethoxylated non-ionic surfactant having an average of from 20 to 100 ethylene-oxy groups per molecule with from 0.1 to 150 parts by weight of a water soluble thiocyanate.
2. A concentrated non-ionic surfactant emulsion comprising water, and said mixture in a concentration adapted to form an emulsion or G phase at a temperature below 40°C.
3. A structured surfactant composition capable of suspending solids which comprises a structuring surfactant, water and, if required, electrolyte in relative proportions adapted to form a dispersed lamellar and/or spherulitic structured surfactant system, capable of forming an L<sub>2</sub> phase at some temperature below 50°C and, optionally sufficient of a deflocculant to inhibit the flocculation of said system characterised in that said composition comprises an effective amount of an phase stabiliser which is a mixture of (i) an ethoxylated non-ionic surfactant having from 20 to 100 ethylene oxy groups and (ii) a water soluble thiocyanate in a relative molar proportion (i):(ii) of from 1 : 200 to 20:1.
4. A composition according to claim 3 wherein said structuring surfactant comprises a major amount of a non-ionic surfactant and a minor amount of anionic and/or amphoteric surfactant.
5. A composition according to either of claims 1 and 2 wherein said stabiliser comprises an ethoxylated C<sub>8-20</sub> fatty alcohol.



6. A detergent composition comprising:-
- (A) 10 to 50% by weight of the composition of water;
  - (B) At least 3% based on the weight of the composition, of a structured surfactant comprising more than 50% based on the total weight of surfactant of non-ionic surfactants having a mean HLB of from 8 to 15 and optionally a smaller proportion of anionic and/or amphoteric surfactant;
  - (C) At least 10% by weight based on the weight of the composition of builders;
  - (D) At least 7% based on the weight of the composition of dissolved non-micelle-forming salts and bases which dissociate at least partially in solution into ions, including any dissolved portion of said builder;
  - (E) A total free alkalinity of at least 0.5 normal;
  - (F) Sufficient of a deflocculant to provide, in conjunction with components A to E above a pourable composition which does not separate after 1 month at 25°C;

Wherein there is additionally from 0.01% to 5% by weight of an auxiliary stabiliser consisting of C<sub>8-20</sub> alcohol ethoxylates having an average of from 25 to 100 ethyleneoxy groups per molecule, together with a water soluble thiocyanate.

7. A composition according to claim 6 wherein thiocyanate is potassium thiocyanate.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/02450

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C11D17/00 C11D1/72 C11D3/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal, PAJ, CHEM ABS Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 079 646 A (UNILEVER) 25 May 1983 (1983-05-25) abstract; example 3 ---	2-5
A	EP 0 414 549 A (ALBRIGHT & WILSON) 27 February 1991 (1991-02-27) cited in the application example 1 ---	2-5
A	DATABASE WPI Section Ch, Week 199548 Derwent Publications Ltd., London, GB; Class G04, AN 1995-366904 XP002149038 & CN 1 096 010 A (LIAO S), 7 December 1994 (1994-12-07) abstract -----	1

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

3 October 2000

Date of mailing of the international search report

13/10/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Saunders, T

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

1987/GB 00/02450

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0079646 A	25-05-1983	AU 550003 B	27-02-1986
		AU 9044182 A	26-05-1983
		CA 1197160 A	26-11-1985
		DE 3271270 D	26-06-1986
		JP 1344688 C	29-10-1986
		JP 58089698 A	28-05-1983
		JP 61009355 B	22-03-1986
		US 4530780 A	23-07-1985
		ZA 8208328 A	27-06-1984
EP 0414549 A	27-02-1991	AT 115180 T	15-12-1994
		CA 2023990 A	25-02-1991
		DE 69014773 D	19-01-1995
		DE 69014773 T	11-05-1995
		DK 414549 T	13-02-1995
		ES 2069017 T	01-05-1995
		GR 3015200 T	31-05-1995
		JP 3205500 A	06-09-1991
		JP 7059720 B	28-06-1995
		US 5807810 A	15-09-1998
		US 5964692 A	12-10-1999
CN 1096010 A	07-12-1994	NONE	